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R&D Innovation System for Anti-aging Driven by Integrated Eastern- Western Herbal Technologies

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Abstract

Healthy aging is increasingly viewed as a nutrition-responsive, multisystem process involving declines in metabolic resilience, skin function, sleep quality, and cognition. Traditional Chinese Medicine links these changes to deficiencies in Essence, Qi, and Blood, while modern geroscience frames aging as interconnected dysfunction from cells to whole-body physiology. To bridge traditional herbal knowledge with contemporary nutrition science, we developed a user-centered East–West botanical R&D platform for healthy aging. Guided by circadian-aligned care and the concept of internal regulation with external nourishment, the platform integrates herbal databases, AI-assisted formula design, processing optimization, and multilevel efficacy validation.

As a representative application, we established an “E+W” strategy combining classical formulas, selected botanicals, and modern bioactives. For internal regulation, Qiongyu Paste, PQQ, astaxanthin, and apple polyphenols were aligned to the hallmarks of aging to support mitochondrial function, autophagy, cellular repair, and resilience [1]. In an 84-day intervention, biological age decreased by 0.84 years and serum NAD⁺ increased by about 14% [2]. For external nourishment, rare ginsenosides extracted from red ginseng with recombinant human type III collagen improved hydration, radiance, barrier function, collagen production, and skin biological age. Together, this framework offers a translational model for evidence-based botanical nutrition and nutricosmetics with measurable benefits spanning mechanisms, function, biological age, and visible consumer outcomes.

References

- [1] L. Ding et al., “A Novel Herbal Formulation alleviates aging by restoring mitochondrial homeostasis via the UCP2/SIRT6/PGC-1 α signaling pathway”, *Phytomedicine*, under review.
 - [2] J-H Chen et al., “Skin and systemic anti-aging efficacy and mechanisms of the dietary supplement in middle-aged women: in vitro and clinical studies” *Journal of cosmetic dermatology*, under review.
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